

AMENDMENT TO THE CLAIMS

Please amend the current claims as follows:

1. (Currently Amended) A method of masking comprising the operations of:
~~maintaining a surface to be etched below the freezing temperature of a phase change masking material;~~
while maintaining a surface to be etched below the freezing temperature of a phase change material, ejecting in liquid form droplets of the phase change masking material in a pattern on the surface to be etched, the droplets changing from a liquid to a solid after contact with the surface to form a first mask;
etching the surface to remove material from around said first mask to create a first etched surface; and
removing the first mask from said first etched surface.
2. (Currently Amended) A The method of claim 1 masking comprising the operations of:
maintaining a surface to be etched below the freezing temperature of a phase change masking material;
ejecting in liquid form droplets of the phase change masking material in a pattern on the surface to be etched, the droplets changing from a liquid to a solid after contact with the surface to form a first mask, wherein the surface to be etched is maintained at approximately room temperature, and the phase change material is heated prior to the operation of ejecting in liquid form;
etching the surface to remove material from around said first mask to create a first etched surface; and
removing the first mask from said first etched surface.
3. (Original) The method of claim 2 wherein the phase change material is an organic phase change material.
4. (Original) The method of claim 3 wherein the phase change material is a wax.

5. (Original) The method of claim 1 wherein the operation of ejecting further comprises:

generating acoustic waves in a reservoir of the phase change material to eject said droplets.

6. (Original) The method of claim 1 wherein the operation of ejecting further comprises:

utilizing a piezoelectric to generate waves in a reservoir of the phase change material to eject said droplets.

7. (Original) The method of claim 1 wherein the operation of ejecting further comprises:

using thermal effects in a reservoir of the phase change material to eject said droplets.

8. (Currently Amended) A ~~The~~ method of claim 1 further masking comprising the operations of:

maintaining a surface to be etched below the freezing temperature of a phase-change masking material;

ejecting in liquid form droplets of the phase change masking material in a pattern on the surface to be etched, the droplets changing from a liquid to a solid after contact with the surface to form a first mask; ;

etching the surface to remove material from around said first mask to create a first etched surface; and

removing the first mask from said first etched surface;

depositing a second layer to be etched over the etched surface;

maintaining the second layer to be etched below the freezing temperature of a second phase-change masking material;

ejecting in liquid form a second plurality of droplets of the second phase change masking material in a second pattern on the second layer to be etched, the second plurality

of droplets changing from a liquid to a solid after contact with the second layer to form a second mask;

etching the second layer to remove material from around said second mask to create a second etched surface; and

removing the second mask from said second etched surface.

9. (Original) The method of claim 8 further comprising the operations of:

detecting an alignment mark on the first etched surface;

using the alignment mark to determine an orientation and position of the first etched surface;

using the determined orientation and position to control movement of a droplet source ejecting the second plurality of droplets to properly position the second predetermined pattern.

10. (Original) The method of claim 8 wherein the operation of detecting the alignment mark further comprises the operation of:

adjusting a camera to image the alignment mark.

11. (Previously Presented) The method of claim 1 wherein the phase-change masking material is a stearyl erucamide mixture solution.

12. (Original) The method of claim 1 wherein the phase-change material is a liquid at temperatures above 60 degrees centigrade and a solid at room temperature.

13. (Cancelled)

14. (Original) The method of claim 13 further comprising the operations of:

placing the surface to be etched in a chamber;

pumping down the chamber to achieve a low pressure.

15. (Original) The method of claim 1 wherein the operation of removing the first mask from said etched surface uses an organic solvent.

16. (Original) The method of claim 1 further comprising the operation of:
detecting an amount of spreading after deposition of a droplet of the phase change masking material on the surface to be etched; and
adjusting the temperature of the substrate prior to deposition of a subsequent droplet.

17. (Original) The method of claim 16 wherein when the operation of detecting detects excessive spreading, the temperature of the substrate is lowered.

18. (Original) The method of claim 16 wherein when the operation of detecting detects insufficient wetting, the temperature of the substrate is raised.

19. (Previously Presented) A method of patterning a thin film comprising the operations of:

depositing a thin film;
depositing droplets of a phase change masking material with a freezing point between 50 and 100 degrees centigrade in a pattern on the thin film;
etching the thin film to remove portions not protected by the droplets of the phase change masking material; and
removing the droplets of the phase change masking material from the thin film.

20. (Original) The method of claim 19 wherein the thin film is a sacrificial layer such that after the etching operation of the thin film, the operations further comprise:

etching the substrate beneath the thin film; and
removing the thin film after removing the droplets of the phase change masking material.

21. (Original) The method of claim 19 wherein the droplets are generated using acoustic waves generated by at least one piezo-electric transducer.

22. (Original) The method of claim 20 wherein the droplets are generated using an ink-jet system.

23. (Previously Presented) A method of performing a masking process comprising the operations of:

depositing a coating of photosensitive material on a substrate to be patterned;

maintaining the coating of photosensitive material at a temperature below the freezing point of a phase-change material;

depositing droplets of phase-change material on the photosensitive material in a pattern;

exposing the photosensitive material not protected by the phase change material to ultraviolet light;

removing the phase change material; and,

removing the photosensitive material on the substrate not exposed to the ultraviolet light.

24. (Original) The method of claim 23 wherein the photosensitive material is a spin-on polymer.

25. Cancelled

26. (Previously Presented) A method of masking comprising the operations of:

maintaining a temperature of a surface to be etched above the boiling point of a liquid carrier, said liquid carrier including a suspended masking material;

ejecting in liquid form droplets of a solution including the liquid carrier and suspended masking material in a pattern on the surface to be etched, the liquid carrier rapidly evaporating after contact with the surface leaving the masking material to form a first mask;

etching the surface to remove material from around said mask to create a first etched surface; and

removing the mask from said first etched surface.

27. (Original) The method of claim 26 wherein the surface to be etched is maintained at approximately room temperature, and the phase change material is cooled prior to the operation of ejecting in liquid form.

28. (Original) The method of claim 26 wherein the operation of ejecting further comprises:

generating acoustic waves in a reservoir of the phase change material to eject said droplets.

29. (Original) The method of claim 26 wherein the operation of ejecting further comprises:

utilizing a piezoelectric transducer to generate waves in a reservoir of the phase change material to eject said droplets.

30. (Original) The method of claim 26 wherein the operation of ejecting further comprises:

using thermal effects in a reservoir of the phase change material to eject said droplets.

31. (Previously Presented) The method of masking of claim 1 wherein the temperature is maintained high enough to allow adjacent deposited drops to coalesce before freezing.

32. (Previously Presented) The method of claim 31 wherein a series of adjacent drops form a line to enable etching a straight line.